



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/826,057	04/16/2004	Shifang Luo	2004B032	9455

23455 7590 02/09/2007  
EXXONMOBIL CHEMICAL COMPANY  
5200 BAYWAY DRIVE  
P.O. BOX 2149  
BAYTOWN, TX 77522-2149

EXAMINER
----------

BOYER, RANDY

ART UNIT	PAPER NUMBER
----------	--------------

1764

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/09/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

## Office Action Summary

Application No.

10/826,057

Applicant(s)

LUO ET AL.

Examiner

Randy Boyer

Art Unit

1764

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 26 July 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-30 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date See Continuation Sheet
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application
- ☐ Other: \_\_\_\_\_

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :16 April 2004 and 17 September 2004.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-15, and 18-23 are rejected under 35 U.S.C. 102(b) as being anticipated by Koch (US 3183278).
3. With respect to claim 1, Koch discloses a process for reducing naphthalene concentration in a naphthalene containing aromatic fluid, the process comprising hydrogenating at least a portion of the naphthalene in the presence of a Group VIII metal catalyst (column 1, lines 30-50) at a temperature from 50°C to 110°C (column 3, lines 19-21) to form tetrahydronaphthalene (column 2, lines 12-14).
4. With respect to claim 2, Koch discloses wherein tetrahydronaphthalene is further hydrogenated to decahydronaphthalene (column 2, lines 12-14).
5. With respect to claim 3, Koch discloses wherein the metal catalyst comprises palladium (column 3, lines 4-6).
6. With respect to claims 4 and 5, Koch discloses wherein the catalyst is supported (column 3, lines 10-14).

Art Unit: 1764

7. With respect to claim 6-8, Koch discloses wherein the metal catalyst comprises palladium at 0.5 wt% on an alumina support (column 3, lines 4-14, and Table A).
8. With respect to claims 9-11, Koch discloses wherein the metal catalyst comprises palladium at 0.5 wt% on a carbon support (column 3, lines 4-14, and Table A).
9. With respect to claims 12-14, Koch discloses wherein the metal catalyst comprises palladium at 0.5 wt% on a silica support (column 3, lines 4-14, and Table A).
10. With respect to claim 15, Koch discloses wherein the hydrogenation occurs at a temperature from 0°C to 400°C (column 3, lines 19-21).
11. With respect to claim 18, Koch discloses wherein the hydrogenation occurs in a fixed bed reactor (Example IV).
12. With respect to claims 19-23, Koch discloses wherein the aromatic fluid is naphthalene (column 1, lines 62-64, and column 2, lines 3-4).
13. Claims 16, 17, 24, 27, and 28 are rejected under 35 U.S.C. 102(b) as being anticipated by Nowack (US 3912787).
14. With respect to claims 16 and 17, Nowack discloses a process for reducing naphthalene concentration in a naphthalene containing aromatic fluid (column 3, lines 31-36 and 64), the process comprising hydrogenating at least a portion of the naphthalene in the presence of a Group VIII metal catalyst (column 4, lines 23-25) at a temperature from 50°C to 110°C (column 5, lines 52-54) to form tetrahydronaphthalene (column 7, lines 35-36), wherein the hydrogenation occurs at a pressure from 100 psig to 3500 psig (column 5, lines 56-61).

Art Unit: 1764

15. With respect to claim 24, Nowack discloses wherein naphthalene conversion to tetrahydronaphthalene is greater than 85% (column 8, lines 3-4).

16. With respect to claims 27 and 28, Nowack discloses wherein selectivity to tetrahydronaphthalene is greater than 85% (column 8, lines 1-3).

***Claim Rejections - 35 USC § 103***

17. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

18. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

19. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

Art Unit: 1764

not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

20. Claims 25, 26, 29, and 30 are rejected under 35 U.S.C. 103(a) over Nowack (US 3912787) in view of Dunkel (US 1965956).

21. With respect to claims 25, 26, 29, and 30 Nowack discloses a process for reducing naphthalene concentration in a naphthalene containing aromatic fluid (see Nowack, column 3, lines 31-36 and 64), the process comprising hydrogenating at least a portion of the naphthalene in the presence of a Group VIII metal catalyst (see Nowack, column 4, lines 23-25) at a temperature from 50°C to 110°C (see Nowack, column 5, lines 52-54) to form tetrahydronaphthalene (see Nowack, column 7, lines 35-36), wherein naphthalene conversion to tetrahydronaphthalene is 94% (see Nowack, column 7, lines 3-4).

Nowack does not disclose wherein naphthalene conversion to tetrahydronaphthalene is greater than 99% or wherein the selectivity to tetrahydronaphthalene is greater than 98%.

However, Dunkel discloses a process for the hydrogenation of naphthalene to tetrahydronaphthalene and decahydronaphthalene at a pressure of 150 atm and temperature of 300°C in the presence of a nickel-molybdenum catalyst (see Dunkel, Example 3). Dunkel discloses that under these reaction conditions, decahydronaphthalene is obtained along with a minimal amount (3%) of tetrahydronaphthalene (see Dunkel, Example 3). Dunkel further discloses that when

Art Unit: 1764

the reaction conditions are held constant and the pressure is lowered to between 50-70 atm, then tetrahydronaphthalene is exclusively obtained (see Dunkel, Example 3). Thus, Dunkel discloses that for otherwise equal reaction conditions, a drop in pressure will shift the reaction equilibrium toward the complete conversion of naphthalene to tetrahydronaphthalene with no decahydronaphthalene being produced.

Therefore, it would have been obvious to the person having ordinary skill in the art at the time the invention was made to lower the reaction pressure of the Nowack process to such a degree that a naphthalene to tetrahydronaphthalene conversion of greater than 99% were obtained, along with a corresponding selectivity to tetrahydronaphthalene greater than 98%.

### ***Conclusion***

22. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Randy Boyer whose telephone number is (571) 272-7113. The examiner can normally be reached Monday through Friday from 8:00 A.M. to 5:00 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn A. Caldarola, can be reached at (571) 272-1444. The fax number for the organization where this application or proceeding is assigned is 571-273-8300.

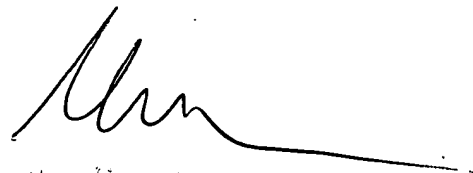
Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR.



Art Unit: 1764

Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

RPB



Handwritten signature of the Patent Examiner.

Patent Examiner  
Superior Patent Examination  
Technology Center 1764